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THE
ART
OF
FLOATING LAND,

AS IS PRACTISED IN THE
COUNTY OF GLOUCESTER,
SHEWN TO BE PREFERABLE TO ANY OTHER
METHOD IN USE IN THIS COUNTRY;

WITH
A PARTICULAR EXAMINATION

OF WHAT

**MR. BOSWELL, MR. DAVIS, MR. MARSHALL,
AND OTHERS,**
HAVE WRITTEN ON THE SUBJECT.

MINUTE AND PLAIN DIRECTIONS ARE AFTER-
WARDS GIVEN, FOR THE FORMATION OF
A FLOATED MEADOW,

WITH
THREE DESCRIPTIVE PLATES.

By T. WRIGHT, *R.*
AUTHOR OF *LARGE FARMS RECOMMENDED.*

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(二)

GENERAL VIEW
OF THE
ART OF FLOATING.

ART OF FLOATING

THE great utility of *watering*, or rather *floating* grass-land, is now pretty generally known and acknowledged. The art, indeed, has of late met with a variety of zealous advocates. Almost all the agricultural surveyors of counties have warmly recommended it. The late president of the Board of Agriculture has paid it a due tribute of attention. Mr. Young in his Annals, has taken every opportunity of placing it before the public in a favourable light. Mr. Marshall in his Rural Economy of the Midland

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Counties,

counties, has exhibited it to the world, as a “cardinal improvement,” and “as the most scientific operation that has entered into the common practice of husbandry.” And Mr. Boswell, by a voluminous description of the Dorsetshire practice, has very laudably contributed towards disseminating so much of the advantages and method of *watering*, as has induced many to attempt the execution of it; which attempt must, (whatever be the inferiority of his mode), prove an extensive national benefit. Floating, however, is still very partially practised, still very generally misunderstood, and the true method appears to me to be rapidly degenerating into a mere *wetting* of the land. I have found most persons with whom I have either conversed or corresponded on the subject, though they have professed to have read Boswell, Wright, and others; impressed with not only inadequate, but injurious ideas of the art: one, esteems all water under this management, equally efficacious; another imagines, that more depends upon the nature of the land, than on the quality of the water; another

another thinks, that the water is to be used chiefly in spring and summer; another supposes it possible to make great and extensive improvements by a very small quantity of water; and almost every one expects something preternatural from this use of water in its pure elementary state. These misconceptions, therefore, must eventually prove a powerful obstacle to the growth of this very valuable branch of husbandry. I have frequently been requested by gentlemen in distant parts of the kingdom, to send them men well acquainted with the art (from South Cerney, a village in Gloucestershire, which has long been, and still continues, a very valuable nursery for persons of this description) to float large tracts of land, where, when the floater has arrived, he has found the stream that was to accomplish all this, diminutive enough, according to his own expression, to flow through a pint cup; of course the work has either not been attempted, or, if the proprietor of the land has been hardy enough to persist in the execution, disappointment to the possessor, and discredit to the practice,

has in a great degree been the result. Indeed, in very few instances, in which I have sent men for this purpose, has there been found water sufficient to give an effectual covering to all the land, which has been thought capable of being floated. It is evident therefore, that what has as yet been written on the subject, has by no means given a precise idea of the practice, but has in some instances, had a worse tendency.

I feel it a duty therefore, that I owe to a certain part of the community, again to step forward and endeavour to point out the causes of these opinions evidently founded in error; and thereby to counteract their injurious effects. For this purpose, instead of publishing another edition of my Treatise on Watering, I shall take new ground, adopt new terms, and give a description as free as I can from provincial and technical words, and, if possible, not liable to misconception. I shall endeavour to convey only one idea of the true objects of the practice, at least the objects which the farmers in the county of Gloucester,

ter, (where I am persuaded that floating, has been practised as long, upon as rational a system, and with as beneficial effects as in any part of this country), wish thereby to obtain, and which I will venture to assert, ought to be the only objects in every county, and in every situation, where the climate is as cold as that of England.

Any person who has read Mr. Marshall's Rural Economy of Gloucestershire, or Mr. Turner's Survey of the County, will be surprised on reading the above commendation of the Gloucestershire mode of floating; for in all their circumstantial and extended accounts of the husbandry of the district, he has found little or nothing said, of this very extraordinary method of fertilization ~~now~~, tho' it has prevailed there more than a century. Mr. Marshall has not even hinted at the practice, and Mr. Turner has mentioned it in a way, that makes it appear insignificant.

Any

As I proceed I shall take the liberty of combating and contradicting many positions and assertions of different writers on this subject, which appear to me, to have been the principal causes of the too general misconception of the practice; but more particularly of Mr. Boswell, whose sentiments have been more widely and systematically diffused, than those of any other advocate in the cause.

I have in the title, and other parts of this treatise, substituted the term *floating*, in the place of that of *watering*, as more expressive of the thing intended. The word *watering*, I fear, has not contributed towards a clear conception of the business, but has given a notion of water used merely for the purpose of wetting the land, for which a small quantity is sufficient, whereas the true practice requires a complete sheet of quick flowing water, at least an inch deep or thick. Indeed, I do not know any one word that will give an adequate idea of the art. In the county of Gloucester and in Wiltshire, it is fre-

frequently called *drowning*, or winter drowning, but this runs into the opposite extreme, and denotes too much water in use, and seems to express water kept in a stagnant state, which is very pernicious, if suffered to continue any length of time.

Floating; in my opinion, comes nearest to express what is meant by the practice in its most complete state. I lay the more stress on this point, that I may, if possible, divert the attention of those who wish thus to improve their land, from small rivulets and springs, and fix it on a more ample source of manure. I wish to turn the thoughts of men of property, to rivers larger even than any that have hitherto been made serviceable in this way, and the improvement, they will find, will be proportionally large. For the water of every copious and rapid stream, is loaded with manure of the most fertilizing quality; with this water, it is possible to make land almost as rich as you please, whatever be the nature of the soil, or of the subsoil, without attending so nicely to system as you necessa-

necessarily must, when clear spring water is used; and by this water, an entirely new soil is given to the land in a few years.

If therefore many large rivers are made manageable by the expensive process of embankments, wears, puddling, &c. merely to work corn-mills, why should not the same means be used to obtain a greater object? for I am confident, that in many situations, water may be made of much more extensive utility, in floating land, than in working corn-mills. Instances, in proof of this assertion, might be adduced from various rivers on which this practice prevails, but a convincing one occurs on the river which is my chief scene of action, I mean the river Churn, which is a branch of the Thames, and flows through Cirencester, in the county of Gloucester. On this river, the mills are numerous and valuable, but the improvement made by this stream in floating, is of much greater value. The mills within the distance of five miles, are ten, and are let for about 40*£.* each per ann. but the

acres

acres floated, within the same distance, are 1000, and each acre is improved two pounds in annual value, independent of the extra manure, thereby afforded to other land.

The superior advantage therefore of floating, compared with the product of the mills, is as £.2000, to £.400, and would be greater, if the mills did not operate as an obstacle to the art, by claiming an exclusive right to the use of the water, and of course taking it from the meadows at pleasure, and at very critical times. In some situations, however, there is water enough to serve both the purpose of the mill, and of the meadow; and it seldom happens but that, where a mill can be thus worked, there a certain quantity of contiguous land may be floated. Whenever I pass by a rapid river, therefore, and see no use made of the many tons of rich manure that are suspended in its waters, and are thereby irrecoverably carried into the ocean, I cannot help feeling this as a momentous loss to the community.

I do not, however, here pretend to reject, or wish to depreciate the use of small rivulets, or spring water in floating ; for in many instances, where skilfully managed upon good land, such water will be found highly beneficial, particularly that which has passed thro' strata of chalk. I only mean to say, that the effects of such water cannot be set in competition with those arising from the water of large streams ; and that nothing very great, or very valuable, can be accomplished in this, or any other agricultural process, without manure in substance. It is true, that any, even the thinnest water will, in a favourable spring, force a crop upon the poorest land, but this crop must be, as the land, of an inferior quality, for no one ever yet found good grass, or good hay upon bad land.

It may here be expected, before I proceed to take still greater liberties with, what I call, the misconceptions of others, that I should declare what I mean by floating, or state what are the objects and essentials of that

that mode to which I give so unreserved a preference.

The primary objects of floating, are, I assert, simply these two, to *procure a deposit of manure* from the water used, and by the water at the same time, to *shelter* the land from the severity of winter. And the chief essentials of the art, are, that the water shall be made to flow over the surface of the land, *an inch deep*, during winter, and that no part of the works shall be made *upon a dead level*. Without attention to these two last requisites, the above objects, to which all others are subservient, cannot be fully obtained. For if the water does not flow an inch deep, you do not use as much water as might be effectually strained or sifted by the grass, and of course do not collect as much mucilage as might be collected, nor give a complete shelter to the land. If you use much more than an inch depth, and continue it for several weeks, you destroy your best grasses, which will not bear to be entirely under water for many weeks in suc-

cession. And if any of the ditches are cut upon a dead level, a great part of the water will be kept in a stagnant state, depositing its sediment in the ditches, more than on the surface of the meadow, and soaking into, and chilling the land. If, however, you can so form your meadow as to use the above quantity of water, on the whole, or a part of the land, and each part has a regular descent; the meadow will enjoy every encouragement and protection which grass-land is capable of receiving from the care or culture of man.

Indeed, if you exclude the chilling blasts of winter, any land that is in tolerable heat, will continue to encourage vegetation even in the month of January; but when you not only ward off the effects of wintry winds and frosts, but are incessantly applying manure of the richest quality to the roots, and round the stems of the grass; it may reasonably be expected, that vegetation will be kept up in a high degree, though the season be intensely severe.

It

It may here be asked, will not spring water answer the two above-mentioned purposes? I allow that it will completely answer the latter, but not the former purpose. It will afford the same shelter to land that river water does, and though it be apparently ever so clear, yet the grass acting upon it as a fine sieve, will collect from it some substantial manure, but this manure will not only be much less in quantity, but very inferior in quality. Were it practicable to float land with the water that daily flows through London Bridge, I am persuaded, that such use of it, for only two weeks in a season, (one week to be taken at the beginning, the other at the end of winter), would render the land thus overflowed, more productive than a whole winter's regular watering, with any the most favourable spring water. The quantity of mud collected from the Thames water, even in this short space of time, if it were made to flow with a proper degree of rapidity, would be very considerable, and its quality any one can judge of.

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Specimen of the Advantages of Floating.

ON the advantages of floating, I hope it is no longer necessary to expatiate; but I have lately met with so pregnant an instance of its superior excellence fallen in my way, that I should by no means do justice to the subject if I withheld it from the public. It is an instance, which tends to place the most engaging feature of this practice in a striking point of view, and gives to the production of early green food its proper weight and worth. Indeed the most valuable, and I had almost said, the only improvements of magnitude that have of late years been made, here, in agriculture, have been in the various provisions of green food, afforded for the necessity of winter, and for the more pressing wants of the two first months of spring. In this series of improvements, I beg leave to class this relative art, which, though it cannot, in every situation, be so widely extended as the cultivation of turnips,
rape,

rape, cabbage, lucerne, &c. yet, where it can be fully executed, it will in no wise disgrace the relationship in which I have placed it, but will afford it abundant aid and support. For floated meadows not only require no manure from the farm-yard, but liberally encourage the plough, by affording an annual extra supply of manure: and although by this practice, the farmer cannot provide green food for all the months of winter, yet he can, thereby, considerably shorten the wintry void; for in March and April, which are the two most trying months to the farmer, these meadows are covered with grass enough to receive any kind of stock, if the weather will permit.

The strong proof of the great utility of this practice, which, I above allude to, is this. Having heard that the proprietor of an old floated meadow, in the village which I have had occasion to mention before, had disposed of the produce of it, in the year 1795, in a way that was well calculated to ascertain its real value, I wrote to a person
who

who resides on the spot, requesting him to send me a particular account of the product of the meadow, and I received the following statement:

In order to make the most of the spring feed, the proprietor kept the grass untouched till the second day of April, from which time, he let it to the neighbouring farmers, to be eaten off in five weeks, by the under-mentioned stock, at the following rates per head: a sheep 10d. per week, a cow 3s. 6d. a colt 4s. The quantity of the land is eight acres.

	£. s. d.
107 Wether sheep, one week - -	4 9 2
8 Cows - - ditto - -	1 8 0
4 Colts - - ditto - -	<u>0 16 0</u>
	6 13 2
	<u>5</u>
Total of five weeks	33 5 10
3 Colts, 3 weeks to be added	<u>1 16 0</u>
Total	<u>35 1 10</u>

After this statement, my correspondent, sensible that it is this spring crop which principally claims the attention of the public, and on which I ought to lay peculiar stress in recommending the practice, dismisses the subject with saying, that the hay crop was as usual, about fifteen tons, and was six weeks in growing.

The above sum, it should be observed, was made by the owner of this meadow, at a time, when other grass-land is in a dormant state, or exhibits but feeble symptoms of vegetation. He had received more than four pounds an acre for his land, when his less fortunate neighbours were only looking forward to two future crops, in which expectation he has at least an equal prospect with them.

But the reader will perhaps see the advantages of this art, in a still stronger light, when he is told, that this meadow, which is now in the occupation of a miller, was a few years ago in the hands of a farmer,

D who,

who, being at variance with the miller, was entirely deprived of the use of the water, for a whole winter, which unfortunately was succeeded by a very dry spring and summer; of course the spring-feed was lost, and the whole hay-crop of eight acres, was only three tons.

Such a specimen of productiveness as the above, one would hope, will carry sufficient weight with it, to turn the scale against any objections to the practice, arising from a dread of expence, or from an aversion which many entertain to, what they style cutting their land to pieces; and will prevail upon every one, who possibly can, to adopt this mode of improving his land. I trust likewise, that the above instance of fertility, will be esteemed a proof that this is not merely book-farming, but is worthy the attention of real practical farmers; and in confirmation of this, I could adduce several instances of *renters* of land, having profitably expended several hundred pounds in forming meadows of this kind, without any allowance from their landlords; than which, a

more

more clear demonstration of the great utility of floating, in my opinion, cannot be given.

Examination of Mr. Davis's Account of Watering.

Before I proceed to make my Observations on certain parts of Mr. Boswell's Treatise on Watering, which appear to me to be at variance with the true practice, and which will necessarily be rather numerous; I shall take the liberty of pointing out a few errors, which I have discovered in Mr. Davis's and Mr. Marshall's account of the art.

Mr. Davis, in his Agricultural Survey of Wiltshire, in describing what he calls flowing meadows, says, p. 33, "It is usual to make the ridges thirty or forty feet wide, or, if water is abundant, perhaps sixty feet." This is a fundamental mistake, and shews that Mr. Davis is not so compleatly master of this art as he seems to be of almost every other branch of husbandry. It is, in other

words, saying, that the more water there is, the less is used. Or, where water is not abundant, use it freely, strain or sift it only over narrow beds; but where it is abundant, make the most of it; strain or sift it over wide beds, and detain it twice as long in the meadow as you do in the other case.

Where water is abundant, I insist upon it that no ridge should be made sixty feet wide; none should be wider in this case, than twenty-four feet. I am glad to hear from the Gloucestershire Floaters, who have been some years laying out large tracts for the Duke of Bedford, that where they have been allowed to put in practice the true system; and to make their beds only four yards wide, which is eight yards to the ridge; for it is not every employer that is satisfied with this short use of the water, or that will suffer this free cutting of the land.

P. 37, Mr. D. says, "In autumn watering, if water can be commanded in plenty,
the

the rule is to give it a thorough good soaking at first."

Mr. D. could not have used a more improper word, in this instance, than that of soaking, which is by no means an essential part of the system in autumn and winter. Soaking, I grant, is an unavoidable, but it is at the same time; an injurious attendant on the practice in the cold season. Why do Mr. Davis, Mr. Marshall, and Mr. Boswell, lay so much stress upon the good effects of an absorbent bottom in watering? but merely because such a sub-soil is the soonest free from the chilling effects of soaking water. I do not think it necessary, or favourable to vegetation, that the land under this process, should, during the winter months, imbibe even one drop of water: and, I am persuaded, that if a floated meadow could receive its usual manure and shelter, by any other medium than a fluid, that the herbage would be more valuable than it is at present.

" This first soaking," Mr. D. afterwards says, " is to make the land sink, and pitch close

close together." How land that has been compressed for several weeks by the heavy treading of cattle, can be made to sink still closer together by means of water thrown over it, I cannot conceive. If Mr. Davis had said that water was used more freely in autumn than at other times, in order to collect as much mud as possible, I should perfectly have co-incided with him in opinion.

Mr. D. in the same page, says, "when the water is taken off, then the works are made as dry as possible, to encourage the growth of the grass." But it will be found, that the grass will seldom grow at this season when deprived of the shelter which is afforded by the covering of the water, and if the weather is not mild, it will often shrink and lose ground.

Mr. Davis again adds, "While the grass grows freely, a fresh watering is not wanted, but as soon as it flags, the watering may be repeated for a few days at a time." Here Mr. D. appears to me, to fall into the common error, of attributing the very essence

of

of this practice to a mere wetting, or according to Mr. Boswell, p. 32, to a “refreshing of the land with water.”

These two last quotations, it will be observed, contradict each other; for in the first instance, the land is made dry to encourage the growth of the grafts, and in the second, it is made wet for the same purpose: but I have not introduced them from the captious motive of exhibiting an inconsistency in the words of a superiour agricultural writer, but, because I think they may materially affect the practice. For, although the process of watering has that alternacy which Mr. D. has justly remarked, yet this change from wet to dry, and dry to wet, is not made, I presume to say, for those reasons assigned by Mr. Davis. In the former case, the land is made dry to give it air, to prevent the rotting of the roots of the grafts, and to hinder the generating of that scum which would soon destroy every blade: and in the second instance, the water is thrown over again, to collect mud, and to shelter the land.

Exam-

*Examination of Mr. Marshall's Account of
the Art.*

Mr. Marshall, in his *Rural Economy of the Midland Counties*, in describing watered meadows, vol 1. p. 226, says, "The warmth communicated by running water to the grass it flows over, is the best account that the most enlightened in the art can give of its good effects." If this be true, the second, third, and fourth use of the same water, will be as enriching to the land in every instance as the first use, which is known by every practical man never to be the case. If this be true, we have nothing more to expect from floating than a mere excitement of vegetation, without any additional support given to the staple of the land, to enable it to answer and bear up under this unusual force. If I were not very well assured that far more substantial aid is afforded by this practice to the land, I should not have taken the liberty, or thought it worthy the pains of writing a recommendatory book on the subject.

subject. Of what use, let me ask, can it be to stimulate, and exhaust, land that is already poor? But it is, I am sorry to say, too much the fashion of the present day, encouraged by the generality of agricultural writers, to force land beyond its strength.

P. 228, Mr. M. says, " It being impossible in practice, to render the sheet of water throughout of a uniform depth or thickness."

If Mr. M. when he was in Gloucestershire, for the purpose of investigating the husbandry of that part of the kingdom, had seen the floated meadows in the vicinity of Cirencester, (and it is truly surprising to me, that he could reside twelve months so near them, without either seeing them, or hearing of them,) he would not have made the above remark, for he would, there, have seen hundreds of acres, in the old meadows, under sheets of running water never perceptibly varying half an inch in depth.

P. 235, Mr. M. says, "Mr. Bakewell studied the art of watering, in the principal scene of business, the West of England, under Mr. Boswell."

I have heard, from authority which I have no reason to doubt, that Mr. Bakewell, first learnt the art of floating at South Cerney, in Gloucestershire; and, that "the West of England is the principal scene of business" in this way, I will not allow; till Mr. Marshall, has produced a specimen of greater fertility, arising from the Dorsetshire method of watering, than that which I have given as the effect of my favourite mode.

Mr. M. afterwards says, "that watering is not merely a stimulus, or force, but communicates, real nutriment to the herbage."

I am very happy to find Mr. M. here relinquishing his very untenable position, that every thing in this practice, is to be attributed to warmth, communicated by the running water.

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But, I trust, when this subject has been more amply discussed, and the plan more generally adopted, that the more substantial ground of real nutriment attrated and separated from the water, will be universally received.

Mr. Marshall in his Rural Economy of the Southern Counties, v. 2, p. 333, speaking of the watered meadows, near Salisbury, observes, " That the the soil is mostly thrown into ridge and furrow; with *deep* floating trenches on the tops of all the ridges, whether long or short." And again, p. 334, large *deep* floating trenches on the ridges; narrow drains in the furrows."

This shews a great defect in the Wiltshire plan, if Mr. Marshall's account be correct. These trenches, or floating-gutters, ought never to be made deep, nor ought the drains ever to be made narrow, when their corresponding trenches are large.

P. 333, Mr. M. asks, " Does the water retained in these deep trenches, convey nu-

triment to the soil and substrata? or give them more readily a plenitude of moisture?"

To this question, every practical floater will reply, that the nutriment should be conveyed to the surface only; and that the soil, and substrata, are always wet enough, without the soaking of this injudiciously retained water.

Examination of Mr. Boswell's Account of the Art.

Mr. Boswell, p. 6, commences with, and founds the chief structure of his Treatise upon, what appears to me, a false principle, the attributing the excellence of floating, more to the nature of the land floated, than to the quality of the water used. In the scale of productiveness, he gives the precedence to gravelly, or sandy soils; in the second rank he places, boggy, and rushy land; and in the last class, strong, cold, clay land. For a few years, I grant, the difference of soil may have a considerable effect, but after a continu-

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ance of floating, good water will form for itself, a good new soil. I could shew Mr. B. all these sorts of land upon one and the same stream, under the same management, and each equally productive. I could shew him in the same floated meadow, gravelly, boggy, and clay land, without any apparent difference in the crop.

The floaters in Gloucestershire, when consulted on the practicability and probable advantage of the art, in a situation which they are unacquainted with; never ask, or care, what the land is, provided there is a copious stream, and a quick descent in the meadow. Give them plenty of water that is enriched with the wash of a village, or of a fertile country; and fall enough to keep every drop in motion, and they will pledge themselves to make every acre of land, so circumstanced, worth three pounds a year.

P. 10, Mr. B. says, he " Knows a considerable tract of land, and one meadow in particular, that is watered by springs issuing imme-

immediately out of a fine springy gravel, without any advantage from great towns, &c. being situated but a small distance below the head of the rivulet, and the rivulet itself is fed all the way by springs rising out of its bed as clear as crystal." "Whether," he adds, "It is from the heat of the springs, or whether the friction by the water running over the soil, raises a certain degree of warmth, favourable to vegetation, or from whatever cause it arises, the secundity of this water is beyond conception."

This, and a like assertion of Mr. Boswell's, p. 14, supported by similar expressions of other writers, has given, to those who are unacquainted with the practice, too great reason to expect the most extraordinary effects, from this use of the pure elementary fluid, and to esteem it, not as a *vehicle* or *source* of manure, but *as a manure of itself*. This idea I am sorry to see corroborated by Mr. Bailey in his Treatise on Manures; when he says, "In floating, water is used *as a manure*."

Mr.

Mr. Boswell's notion of the efficacy of the friction of the water, arises, I presume, from his observing that those parts of a meadow are invariably the richest, on which the water flows with the greatest velocity. This inequality of fertility, however, may be accounted for, on more substantial ground, than on the principle of warmth communicated by friction; for where the water flows with rapidity, you of course, use twice as much as you do, on the same quantity of surface, where it moves sluggishly; and if there is any thing substantial to be thus collected from the water, two tons will doubtless afford more mud than one can give.

Mr. B. in continuation, adds, p. 11,
 " And although the water is so exceeding clear, yet upon its being thrown over the land, only for a few days in warm weather, by dribbling through the grass, so thick a scum will arise, and adhere to the blades of the grass, as will be equal to a considerable quantity of manure spread over the land, and
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(it may be presumed from the effects) still more enriching."

Mr. B. I believe is the only person, who has attentively considered this subject, that will allow this scum in any instance to be enriching to land. In every example that I have seen, or heard of, it has been found *poisonous* to the grass. If scum were conducive to fertility in a floated meadow, every flat or low part of the beds, where the water runs slow, and where the scum is generated in the greatest abundance, would invariably be the most fertile; but this, experience tells us, is never the case. This scum appears to me, to be a mere collection of small bubbles of simple water, which adheres to the blades of the grass.

P. 16, Mr. B. says, "The Dorsetshire watermen, except in large undertakings, dispense with the use of the water level, bringing the water after them to work by."

It must doubtless be a more certain, more expeditious, and less expensive plan to take an accurate level of the land, before any advance is made in the work. There is scarcely one of the floaters which I have mentioned, that does not carry with him a spirit-level; this he thinks as necessary a part of his apparatus, as his water-proof boots.

P. 28, Mr. B. says, " Every inequality in water meadows, should either be levelled down, or filled up."

This direction must be regulated by the expence, which is the most powerful enemy that this practice has to contend with; for it often happens that a twentieth part of a meadow, may cost more in being levelled down to the general surface, than all the other parts in being effectually floated. In every instruction that I give, I shall cautiously avoid the rock of expence. I know many farmers who wish to preserve a small eminence in their meadow, for the cattle to resort to, in a rainy night, both to prevent

the treading of the grass, and to accomodate
the cattle.

P. 29, Mr. B. says, "The water having
been so very lately strained over the ground,
it is supposed by the watermen to be not
so enriching as it was before it was used."

This is not a mere supposition of the wa-
termen, but is a principle in the Art of Flo-
ating which ought upon every occasion to be
peremptorily insisted on; although it may
be at variance with some parts of Mr. Bos-
well's System. Indeed, not only is the bed
which receives the first water, more fertile
than those that have the second or third use
of it, but the upper part of every bed is richer
than the lower part; especially where it is
made more than four yards wide. Of this,
the cattle, when turned into the meadow, will
give an incontrovertible proof, by leaving the
grass on the lower part untouched, till that on
the upper part, which is always more luxu-
riant, is entirely eaten off.

P. 31, " The larger the body of water that can be brought upon very boggy land, the better. Its weight and strength will greatly assist in compressing the soil."

I agree with Mr. Boswell, that it is very advantageous to boggy land, to have a large body of water brought upon it when it is first formed for floating; for the more strong and rude the current, the more mud, sand, or gravel, will be carried upon the meadow; matter of this kind, however coarse it may be, will greatly improve the land, by giving it that stability and soundness which are so peculiarly requisite to a surface of this kind. I cannot however, conceive that boggy land, though Mr. B. has frequently repeated it, can be compressed by a sheet of water; for, to me, it always appears to be dilated by water, as a sponge is.

P. 54, Mr. B. speaking of the Dorsetshire watermen, says, " Besides, though many workmen may be met with exceeding clever in the execution, and even in the direction

of the work, yet, in general, so confused are their ideas, that they are unintelligible; and their mode of directing, unsatisfactory; being mostly conducted without a plan, and executed as incidental circumstances arise, still blundering on with the work they have begun, many trenches and drains are cut improperly. The result of all which is, an incomplete performance at first, and every year after emendations and alterations follow; some for the better, but many for the worse, to the great disfiguring of the meadow; extraordinary expence to the owner, as well as betraying the ignorance, or want of skill in the undertaker."

Whether this charge of incapacity be applicable, or not to the Dorsetshire watermen, I cannot say, but that it does not apply to the Gloucestershire floaters, I have no hesitation in affirming. I am persuaded that any one of these floaters, who, has been regularly brought up in the practice, would give a clearer idea of it, in one hour's conversation on the spot, than Mr. B. or I can,

by

by writing volumes on the subject. Indeed, I have scarcely ever ventured to give one positive direction relative to the art, either in my preceding Treatises or the present, without first consulting these practical men, on its propriety. On this ground, I have expressed myself with the more confidence, conscious that I have advisers, who have executed the work, and seen its effects, under almost every variety of circumstances that can occur in this Island. For I can, with no small degree of satisfaction, say, that I have been instrumental in sending these men into various parts of Wales and Scotland, as well as England, and hope very soon to receive further commissions for this purpose.

P. 65, Mr. B. says, "The more surface there is in the panes, the more water is required to flood them;" and again, p. 25 and 75, "the width of the trenches that convey the water varies according to the breadth of the panes."

By pane, Mr. B. means, what I have called bed, and by trench, a floating-gutter.

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If he wil re-consider the above assertions, he will immediately discover, that the *breadth* of the pane, or bed, by no means determines the *width* of the trench or gutter, or the quantity of water that is required; for a bed of only one foot width will consume as much water as a bed of thirty feet, provided the water flows in both cases with the same depth and velocity. The quantity of water will depend in a certain degree, upon the *length* of the bed, but not upon its *breadth*. A broad bed will use the water a longer time, but will not take more water.

P. 86, " In erecting wears, &c. " Mr. B. says, " Clay must always be avoided, it is worse than the common soil."

Clay has almost invariably been used for this purpose in Gloucestershire, and is found to answer very well, where it is not outside work, and exposed to the frost.

P. 98, Mr. B. says, " The trenches, drains, &c. will, if the land is pretty firm,
by

by thus repairing, do their offices three years; otherwise not more than two.'

I cannot conceive what defect it is, in the constructing of the Dorsetshire trenches and drains, that makes them thus liable to fail in two or three years; for all the ditches and works formed according to the Gloucestershire mode, will last for ages, with only a little repairing after the treading of the heavy cattle.

P. 104, "When the water is low, keep it together, rather using it to water only two or three trenches well, than letting it run down to the tails of many, which rots the ground there, and does no good at any other part."

This is an excellent rule of Mr. Boswell's, and if the other parts of his book were consonant with this, the difference of our plans would have been too inconsiderable to have called forth this particular notice.

P. 106, " About a week before the grass is to be mown, let the water into it; for about twenty-four hours, it will make the ground moist at the bottom, the scythe will go through it easier, and it will be mown the closer for it."

This is a very improper direction on several accounts. The water thus let in, though it be ever so clear, will leave a filthy substance on the grass very injurious to the hay; it will make the ground too soft, to bear the carriages loaded with the hay; and will give a wetness to the land, which will occasion the hay to be at least a day longer in making than it would have been, if the land had been perfectly dry, which in some seasons, may not only injure, but spoil the whole crop.

P. 106, " The feeding the meadows about Lady-day, is called spring feeding, and should never be done by any other cattle, besides sheep and calves."

A dairy farmer will totally disregard this restriction, convinced by experience, that, if the meadow is laid dry before the cattle are admitted, the harm that can arise from their treading, is by no means worthy of comparison with the great advantage, which a hard-wintered stock of cows will derive from such grass, at such a season.

P. 112, " In this manner the after-grass will, in a mild season, last the cattle till Christmas."

I answer that the after-grass should never be left uneaten till Christmas; the meadow should be prepared to receive the water at the beginning of November.

In the above page, Mr. B. says, " The after-grass should not be fed by sheep. It will infallibly rot them in this county."

The after-grass, in the generality of floated meadows, which I have seen, will not endanger the soundness of the sheep which

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feed upon it, unless water has been thrown over the meadow in summer. I had frequently been told that watering even for one day in *summer*, would render any meadow an unsafe pasture for sheep in the autumn; to this assertion, I did not give credit, till a few years ago, when I had an opportunity of ascertaining the fact, in a meadow, which I rented purposely for the sake of making this, and other experiments.

P. 114, Mr. B. begins his 15th. chapter, in which he confines himself to a review of my first publication on watering; and for the observations which he has there made, I am so far from thinking his apology necessary, that I wish, instead of insinuations, he had proceeded to direct animadversions, or open contradictions, where he thought me erroneous. This appears to me, the mode best calculated to bring forward and establish the truth; which, on all occasions, great or small, is too valuable to be sacrificed to the complaisance of scribblers.

In
dawn quaff air so blithely and bright
but

In my Treatise which was published in the year 1789, desirous of shewing, what I still find it necessary to contend for, that the effects of *spring water* are very inferiour to those of *thick or muddy water*, I gave two instances of meadows, that were watered from springs which arose in the grounds themselves; and asserted that though the crops in these meadows were early and plentiful, yet, they were *not of a good quality*, and that the *land* remained unimproved after many years watering.

To this my doctrine, Mr. Boswell, opposes “contrary effects from a stream, very near the spring head, as clear as crystal;” and unfortunately this opposition and his attempted confirmation of it, Page 115, has been transcribed into the Encyclopædia Britannica, and has given birth to the following more dangerous remark of the editors of that valuable book of reference: “From this passage,” they say, “the latter part of which is not very intelligible, we might

G 2 conclude

conclude that Mr. Boswell, prefers clear to muddy-water for overflowing meadows."

Mr. Boswell, certainly does not intend to say so much as, is here intimated. By "contrary effects," he cannot mean to say that the converse of my whole proposition is true. He must only wish to say, that he knows an instance of a meadow, floated by clear water, producing crops of a good quality, and having its land improved by this water. This is undoubtedly saying a great deal too much, especially when opposed to the effects of muddy water; for, to say nothing of the inequality of the crops, if watering were entirely to cease, Mr. B. would find the staple of his land, neither stronger, nor richer than it was, when this clear water was first brought over it. But, discontinue floating on a meadow, which has had the advantage of muddy water; and its soil will be found to have received an addition that will prove a permanent amelioration. Examine every effect of these two kinds of water, and in no single instance

will

will it be found, that the former is preferable to the latter ; but, if there be any valuable stimulus, force, shelter, or encouragement in clear water ; muddy water likewise has all these, and gives that strength and power besides, which, are always necessary to render the crop, that is produced, *good in quality*. Perhaps the introduction of the following facts, may serve, in some measure to illustrate what I have asserted on this point. About ten years ago, a person from South Cerney, entered upon a farm in the neighbourhood of the well known stream of Bibury; where he had the satisfaction of finding a large meadow already watered; but he soon found, likewise, that its grass, and the hay made from it, were by no means so nutritious as he had elsewhere seen them. Certain of the improvement that might be made, from this copious stream, at least in the quality of the grass, he proceeded to make the following amendments: wherever he found a wide bed, he divided it into two; he increased the width of his conductor, in order to admit more water; and sunk the bottom

bottom of it to the bottom of the stream; to draw in the more mud, which, he took care frequently to disturb, with iron rakes made for the purpose ; and by these means, he informed me, he improved the meadow to twice its former value. Not content with this, he contrived, the year following, to carry a part of the stream through his farm-yard, which was constantly filled with a large stock of cattle and pigs, and with this water he floated nearly an acre of this meadow. The effect of this last process, I went purposely to see, and found, at the beginning of the month of April, that the ewes and lambs had been turned into the meadow two days, where they had shewn a nice discrimination between the grass upon the above acre, and that on the other parts of the meadow: they had eaten the grass, where this foul water had run, to the very roots, and had walked over all the other parts, almost without tasting, though the grass was luxuriant and fine, and the land in a very improved state. This convinced me, that one mouthful of the grass on the former part,

part, was almost as valuable as two of the latter, and that the quality of the grass will always be as the water.

In my treatise, I had mentioned a temporary wear, or dam; and Mr. B. has said p. 116, that such a dam "would not, in Dorsetshire resist the force of the water five hours, in streams that are not more than three or four yards wide;" and reprobated such dams for other following reasons :

By "a temporary wear, or dam, I did not mean one of any particular construction, either weak or strong, but, according to the common meaning of the word *temporary*, such a wear or dam, as might stop the course of the water whenever occasion required. Mr. B. may see that the wear which I now recommend, and have given a slight sketch of in plate 2, though more simple, and far less expensive, is equally strong with that which he has taken up fifteen pages in describing.

In the direction which I gave for watering in the month of February, I mentioned the danger to be apprehended from the poisonous effects of scum, and the destructive severity of a frosty night, and pointed out the usual and skilful method of the Gloucestershire Floaters to avoid the injury from either quarter; which was to take the water off in the day, and to turn it over again at night. This direction Mr. B. seems to think not only extraordinary and unnecessary, but, for several reasons, impracticable. Taking the water off," says he, p. 117, " and turning it over at night in frosty weather, where there are 300 acres to water by one stream, appears to be a very extraordinary direction, and in the country where this treatise is written, would be quite impracticable."

It was shewn in several parts of my book, that these 300 acres were divided into separate meadows; which lay in succession, on both sides of a rapid stream. It was there likewise intimated, that each meadow (whether the whole, or a part of it was watered at one

at one time) quickly threw back the water into the stream, and that the proprietors of the lower meadows did not suffer any one of the meadows above them, to take the whole of the stream, or, as they stile it, the whole of the best water; and also that less water is now required, than in an earlier part of winter. Meadows, therefore, thus situated and circumstanced, are almost independent of each other, with respect to the quantity of water, and, the number of acres will be no real impediment to the adoption of the above process.

Mr. B. afterwards adds, "when the water is turned out of one meadow, it is often half, and sometimes a whole day, before it rises high enough to flow sufficiently over another meadow, to spread it properly over all the works."

This shews that the Dorsetshire meadows are constructed too much upon the dead-leve

plan, and that the water is extended too far. I do not, however, see, how this is reconcileable with what Mr. B. asserted in the preceding page, that the "force of these streams was so great, as not to be resisted, for a few hours, by temporary weirs or dams." Mr. B. must have confounded two streams, for, such opposite effects, cannot be attributed to one and the same current. A meadow formed on the plan which I recommend, may be freed from the water in ten minutes, and, if not larger than seven or eight acres, will be completely overflowed in less than an hour. This time in overflowing, will of course, depend on the greater or less degree of descent in the meadow.

Mr. B. then says, "The sun's warmth is seldom found strong enough to have any effect upon the water in the month of February. It is not uncommon in that month to have the water kept upon the meadows a fortnight, or more."

In some seasons, I allow, the warmth of the sun is not very strong in the month of February; in others, however, it will be found too powerful an agent in the generating of scum. The above rule was given to be observed, when frosty nights prevail, and in such weather, the days are generally clear, and the sun has considerable effect. It appears from other parts of his book, that Mr. B. has not so great a dread of scum, as is entertained by other persons, or he would not have allowed the water to remain on a meadow "a fortnight or more" towards the end of the month of February,

" Frosts of one night, often fix the hatches in the wears so fast, that they cannot be moyed till the frost breaks."

This obstruction, to the direction above given, namely, " taking the water off in the day, and turning it over at night," does not often occur in Gloucestershire, for the wears are, there seldom made with hatches; but are generally constructed in the simple

H 2 way,

way, which I shall hereafter describe. This shews one advantage that the latter has, over the Dorsetshire dam, that a part of it can always be removed at pleasure, and the water sunk or raised as required. When the frost, however, has given a sheet of ice to the meadow, the above rule becomes unnecessary, and, it is then the safer way to discontinue floating, for a severe frost when the water is kept running, often occasions great unevenness in the surface of the beds.

The next remark which Mr. B. makes upon the contents of my first pamphlet, is one, for which, I sincerely return him thanks: it is the correction of a real error which I had fallen into, by taking my estimate of the expences of forming one of these meadows from two improper instances, which had lately occurred, and in both which, nature herself had already nearly laid out the land to the hand of the floater. I there ventured to fix the probable expence of thus forming a meadow; and have since discovered, that I had stated it very much too

too low; and that it cannot be predetermined, but must depend upon a variety of attendant circumstances; though, in general, it will be between three and six pounds per acre.

P. 119, Mr. B. comparing the value of the Dorsetshire meadows, with that of the Gloucestershire, says, "the spring feed is on an average, let for about ten shillings an acre. If situated near towns, butchers will give more. The after-math from ten to fifteen shillings; rarely more. The value of the grass (uncut) for hay, differs exceedingly; the herbage, quantity, quality, situation, and demand for it, occasions a difference from thirty shillings to three pounds an acre. Water meadow lands let, unless in very particular situations, from five and twenty to five and forty shillings per acre, detached from any other land, and then the occupier has the liberty to sell the hay."

From these specimens of the produce and value of the Dorsetshire meadows, their inferiority appears manifest and considerable. "This statement" says Mr. B. "compared with that in the pamphlet before referred to, will plainly shew the vast difference in the nature and value of the soils in their unimproved state."

I am by no means willing, however, to concede to Mr. B. that the great superiority of the Gloucestershire meadows over the Dorsetshire, can arise from the difference that subsisted in the quality of the soils before they were floated; for the soils of the best of our meadows, is, in general, of that very kind which Mr. B. seems almost to contemn; I mean strong clay and boggy soils. The best meadow in the parish to which I allude, is entirely a strong cold clay; and the hay that is cut from this meadow, will rot an ox as soon as the best upland hay in the neighbourhood, though it is an excellent grazing country. This meadow is the best in the parish, merely, I presume

presume to say, because it is the highest upon the stream, and being well attended to, is the first that receives the water, after it is enriched by the wash of the streets, &c. of the town of Cirencester. There is, I ought to observe, another parish intervening between South Cerney and Cirencester, that has several large meadows, which, when they have due attention paid to them, are still more fertile than that above mentioned, and are perhaps, at this time, the best floated meadows in the kingdom. I will venture to say, that these meadows, in this wet and very favourable season, provided they were floated, as they ought to be, at the beginning of November, are, at the time that I am writing this, namely the twenty-fourth day of December, 1798, covered with a crop of grass at least four inches deep: and this grass, we may reasonably suppose, will receive additional strength and firmness before the beginning of the month of March, when, it will afford an ample pasture for stock, if the season be tolerably temperate.

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I shall now conclude my examination of Mr. Boswell, Mr. Davis, and Mr. Marshall, with saying, that I have taken no liberties, in my observations on their writings, which, I shall not gladly submit to from them, whenever my words appear erroneous or even doubtful.

The opinions, however, of the above writers are not the only ones that are hostile to, what I call, the true practice of winter-floating. Wrong impressions are too often received and communicated by those who, have seen the process of watering, and its very extraordinary effects, in warm climates, where the practice is very different, and its objects by no means the same, with those that a farmer has in view from it in this country. Much, in particular, has lately been said of the very masterly system of watering practised in China; but, there, the object is merely to encourage the rice-crop, and the water is brought upon the land, in a certain quantity, to remain stagnant, till it is removed by evaporation and absorption.

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This practice has, likewise, to contend with the over refined notions of those who have been taught by chemical books, that "water is the food of plants;" and that "water imbibed by plants is transmutable into earth;" to such refinements as these, I can only say, that the practical farmer has a more compendious and more safe method of forming his judgement, by reasoning from *effects*, rather than *causes*.

In the remarks which I have hitherto made, as preparatory to a more clear conception of the method of floating, which I am about to describe, I have endeavoured to place the practice in as many different points of view as possible; which attempt, if it will not serve as an illustration, will, I hope, at least, promote the discussion of a practice, which is as deserving of the consideration of the agricultural world, as any that has of late engaged their attention.

The METHOD of forming a floated Meadow.

Before I begin to point out the particular mode of forming a floated meadow; such questions, as the following are necessary to be proposed: Will the stream of water to be employed in floating, admit of a temporary wear or dam across it? Can you dam up, and raise the water high enough to flow over the surface of your land, without flooding and injuring your neighbours' adjoining land? Or, is your water already high enough, without a wear; or, can you make it so, by taking it out of the stream higher up, and by the conductor, keeping it up nearly to its level, till it enters the meadow? And can you draw the water off your meadow as quick, as it is brought on? If you are free from all objections of this kind, you may proceed in the following manner:

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In the first place, when the descent is not sufficiently great to be determined by the eye, take an accurate level of the ground intended for floating, and compare the highest part of it, with the height of the stream of water to be used. Ascertain how many inches fall, there are, from the surface of the water, to the highest part of the land: if the highest part of the land, be adjoining to the stream, the process is easy; but if, as it often happens, it be distant from, or the farthest part from the stream, the execution becomes more difficult; as it is necessary, that the sides of the ditch which introduces the water, should be raised all that distance, and kept high enough to carry the water to the aforesaid highest part. In this case, cut, in as direct a line as circumstances will allow, a wide ditch, or master-feeder, keeping up its banks, not upon a dead level, but with a gradual descent from beginning to end. Supposing the highest part of the meadow to be one hundred yards distant from the stream, and you have five inches fall in that distance, you are to

give to the whole length, an equal degree of descent, that is, to each twenty yards, one inch fall, and then every drop of water will be kept in equable and constant motion.

Sometimes the land has a very uneven surface, and there are two or more parts of it considerably higher than the rest; it will then be necessary, as in plate 2, to give to each higher part its respective feeder. It will be found, that one feeder made diagonally, and two others in different directions, something similar to plate 2, will, in general, with the assistance of the smaller works, whatever be the form, or situation of the meadow, be competent to effect a regular distribution of the water over the whole surface of the land.

The width of each feeder, depends upon the number and length of the smaller ditches, or floating gutters, which it is to supply with water.

The depth of each feeder, should be regulated, by the depth of the stream, and the lowest part of the land; i. e. it should always be made as deep as the bottom of the stream, if any part of the land be low enough to draw the water from that depth.

The soil that is thrown out in forming the feeders, is placed along the sides of them where wanted, and is always trodden down firm, and with an even descent, on the upper part of the adjoining bed.

A flood-hatch is placed in the mouth of each feeder, in order to admit, or exclude the water at pleasure; and to enable the proprietor, to float the different portions of the meadow alternately, when there is not water enough for the whole.

The next part of the process, is, that of forming the second order of ditches, or the floating gutters. These are to be cut from, and at right angles with the above feeders, provided the surface of the land
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be tolerably even, as in plate 1; but, if the surface be very uneven, they may be made irregularly along the higher parts of the ground. The distance of these gutters from each other, must be determined by the abundance or scarcity of water. When water is plentiful, they should never be made, at a greater distance from each other, than ten yards; but, when it is scarce, it is necessary, in order to strain the water to the utmost, to cut them at nearly twice this distance, or to make one gutter where two are desirable. It is to be observed, that these gutters are to be made with the same regular descent, as the feeders; and that both become gradually narrower as they proceed, as in the plates: for the quantity of water becomes less and less, by some flowing constantly over the sides, and some being drawn off by the smaller ditches.

The earth that is thrown out, in digging the floating-gutters, is to be placed on each side of them, where most wanted, in such a regu-

a manner, as to afford, an even surface, and a regular descent to the beds, which constitute, what is called, a ridge. In plate 1, fig. 1, I have endeavoured to represent a ridge of a meadow, in this its first rude state of formation, and in fig. 2, I have attempted to exhibit it, in that state of perfection, which, it will acquire in a course of years. If there are, but few inches fall from the uppermost end of these gutters to the lowest part of the land, use as little of this descent, as you well can in the gutters, and reserve the greater part for the sides of the ridge, that the water may flow down them with the greater rapidity; for it is more requisite that it should flow quickly over the beds, than in the gutters, though in them, it ought never to stagnate.

If, in cutting the above works, any very low part, or deep ditch obstruct the progress, it will be easy to carry the water over it, by making a continuation of the

feeder

feeder or gutter with a few boards nailed together.

If a road or small eminence oppose the extension of your works, this obstacle, likewise, will readily be removed, by conveying the water underneath, by means of a trunk; consisting of four strong boards nailed together; leaving a passage of sufficient dimensions, to give the water a free current. A drain, is not unfrequently carried under the other works, by a trunk of this kind.

Having thus completed all the ditches, which are necessary to introduce, and spread the water, these will shew, where the drains are to be made, to receive, and to carry off the water, as fast as it is brought on. One drain is to be cut between every two gutters, parallel to, and equidistant from each, if the evenness of the land will permit; if not, they are to be made, according to the irregularity of the lowest parts of the meadow. Each drain

drain may be made, as deep as you please. The drains are made in an order, which, is the reverse of the preceding works ; they are narrowest at the higher part of the meadow, where the other ditches are widest, and gradually increase in width, as is represented in the two first plates, till they descend into the master-drain, which returns the water into its usual channel.

The master-drain should always, either by depth or width, be made capable of carrying off as much water, as the feeders introduce, since it nearly receives as much ; for, on a well formed meadow, less of the water will soak into the soil, than is generally imagined, especially when the water is muddy and leaves an unctuous sediment on the surface, which, happily prevents soaking.

Having thus completed the formation of the various ditches, having pared down every small unevenness on the surface, and

given to each part of the meadow its appropriate fall; let in the water, and you will find that it will flow on towards the ends of the floating gutters, and will seldom spread itself, as you wish, on the higher parts of the meadow. This is to be remedied, by placing stops, or obstructions, in the feeders and floating-gutters, at distances proportioned to the descent of the land. When the velocity of the water is great, the stops of course, will be numerous. A stop is usually made, by driving down a few stakes, in a line across the ditches which distribute the water; and may be increased, by placing a board, clods of earth, &c. at the front of the stakes. By the obstruction, which these stakes, &c. give to the course of the water, it is checked in its progress, and is raised, and kept up to a proper height, either to flow over the sides of the ditches, or through small notches cut in their sides, at the distance of about a yard from each other; as I have endeavoured to represent in the plates. Indeed, the contraction in the width

width of the feeders and gutters, serves to raise, and force back the water over their sides; but, this is not a sufficient obstruction when the descent is considerable. Stops and notches, have hitherto, been thought indispensibly requisite, in the construction of these meadows; but, I have lately been informed, by one of the above skilful floaters, that he, in the last spring, formed a meadow, which distributes the water with the utmost regularity, without the assistance of either stop or notch. The proprietor of this meadow, (Mr. Talbot, of Penrice Castle in Glamorganshire,) who, seems to have viewed the practice, with no common degree of penetration, finding that his land, and his stream were properly situated for the purpose, was determined, whatever might be the expence, to have a floated meadow, complete in all its parts, and from which, even the appearance of imperfection, should be excluded. Orders were accordingly given, that the land should be formed into ridges of ten yards width; that each feeder and gutter, should have its

appropriate descent of one inch in nine yards; and that each bed, should be a perfect inclined-plane, with two inches fall in each yard. This plan was strictly observed, and every inch of the ground was worked by line and level, and, when the surface was grown sufficiently firm, the water was admitted, and was found, to flow over every part, in a sheet of equal depth, without any other check than what arose from the gradual contraction in the width of the gutters.

This meadow is, probably, the most perfect in its formation of any in the kingdom, but, that it will, therefore, be the most productive, I dare not venture to predict; for fertility depends more on other causes, than on exquisite nicety of construction. There is no doubt, however, of this meadow's affording an abundant remuneration to its owner; though the expence must have been great, as the land, before it was formed into a meadow, was little better than a bed of rushes; but
will

will now, I am told, be worth three pounds per acre. This specimen of perfection, however, is not here introduced as a general model, but, only for the imitation of such gentlemen, as enjoy the ample means and liberal mind of Mr. Talbot.

There is still an inferior order of ditches, called trenches, requisite in the art of floating; whose office it is, to convey the water to any part of a meadow which the larger ditches will not effectually reach, whether it be to the extreme angles of the ridges, as is represented in plate 1, T. T., or to any part in a wide and imperfectly formed bed, which, is higher than its general surface. A trench of this sort, is cut, from the floating gutters, about six or seven inches wide on the surface, and terminating at the bottom in nearly a right angle; and the portion of earth, which, is thus cut out, is regularly laid unbroken along the lower side of the trench, both to keep up the water to its desired height, and to be restored and trodden down with the turf

turf uppermost, when the floating is finished, into the space which it before occupied. When the soil is thus replaced, the green-sward, is not only not injured, but is improved by this cutting; for an extraordinary luxuriancy is always discernible, in the hay crop, in the line in which the trench was made, owing to the mud, which, is ever found abundantly deposited at the bottom of each trench.

I deem it wholly unnecessary to give any directions for the construction of water-hatches, or flood-hatches, either as sometimes forming a part of the wears, or as requisite to be placed in the mouths of the feeders, as in plate 2, F. 1, 2, 3; for the common carpenter, in every village in the kingdom, must have seen them, and is capable of making them. One caution, however, may not be amiss; that care be taken that the frame and foundation of them, be deeply and firmly bedded in puddled gravel, or well-rammed clay, and both the sides, and bottom of them be cased with stone

stone or boards; for if the water once finds a passage either under, or by the sides of these erections, it will soon become powerful enough, to blow up the whole work.

Wears or dams are generally recommended upon an expensive plan, with two, three, or more hatches; but, I have seen wears in different parts of the kingdom, of a more simple make, and yet equally strong, and perfectly adequate to the purpose of a dam, though constructed at one fifth part of the expence of the others: it is therefore, my duty to recommend these in preference to the others, especially in those instances, where the whole charge falls upon a mere renter of the land. I have frequently seen a strong and effectual frame of a wear, composed only of two rough pieces of timber, and a few stakes, in the following manner: one of the pieces of timber, or beams, was laid across the bottom of the stream, below the water; the other across the top, above the water, each beam having its ends firmly fixed in the banks, on each

each side of the stream; and the stakes were placed in a perpendicular direction to the front of these beams, the lower end of each stake resting in a deep groove cut along the uppermost side of the lower piece of timber, and the upper end of each stake bearing against the upper piece of timber. For the position of the uppermost beam, and the upper ends of the stakes, see the wears across the stream in plates 2, 3. The lower piece of timber, in this case, is always placed a few inches higher up the stream, than the upper one, that the stakes may stand perfectly upright, at the same time that they bear against the uppermost piece of timber. Having thus obtained the out-works, or frame of a wear, it will be no difficult matter to fill up, and complete it, with a variety of materials, such as each situation shall most conveniently furnish. When the stream, which is to be obstructed, or diverted by a wear, is as much, as three or four yards in width, it is generally found requisite, to complete it, by placing portions of boards

boards to the front of the stakes, nailed together, in quantities agreeing with the dimensions of the stream; but when the stream is of less width than three yards, it will be thought superfluous, to give any directions respecting the materials which ought to be used in a wear. Behind each wear and flood-hatch, a board or plank is always laid over the stream or feeder, for the person to stand upon, who is to make, or regulate them.

If there be any further directions still required to give a clear conception of the art of floating, I hope, they will be found in the following description of the plates.

A Description of the Plates

PLATE I.

By Plate I, I have endeavoured to represent a meadow, which has no material irregularity in its surface, but has one gradual descent, in the same direction with the current of the river or stream. This meadow is supposed to be too high to be floated from that part of the stream which is nearest, and immediately opposite to it; and therefore, in order to gain fall, or power, the water is taken out at a higher part of the stream, and conveyed by the conductor, marked C. into the feeder, which has a flood-hatch placed in the mouth of it, to admit or exclude the water at pleasure. This conductor, (we will say, for the sake of illustration,) has only four inches descent, in its whole length, but the stream in the same distance, falls ten inches; therefore, six inches of power are gained by means of the conductor, which power, or fall,
is



Fig. 1.

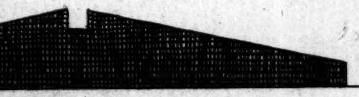


Fig. 2.

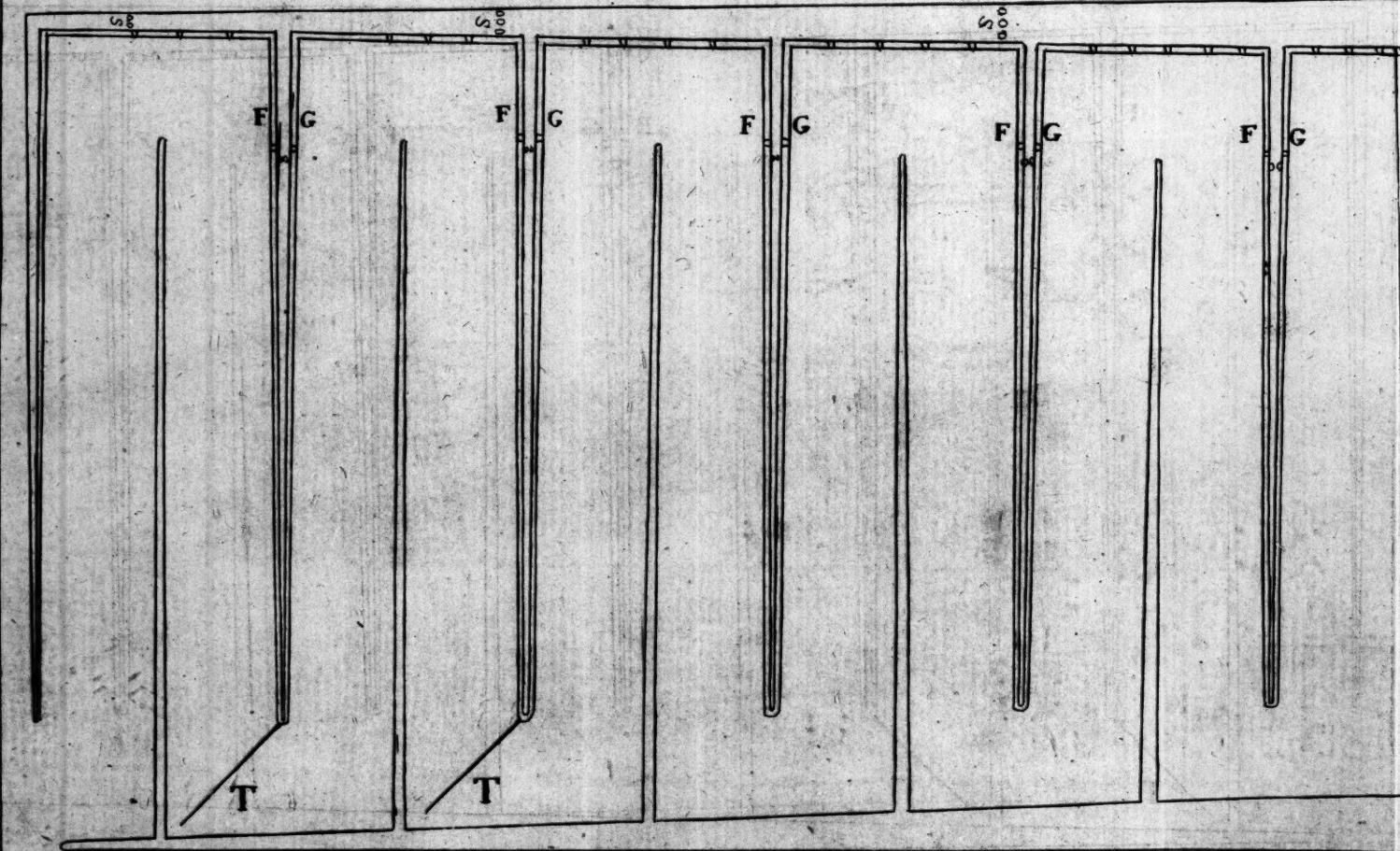
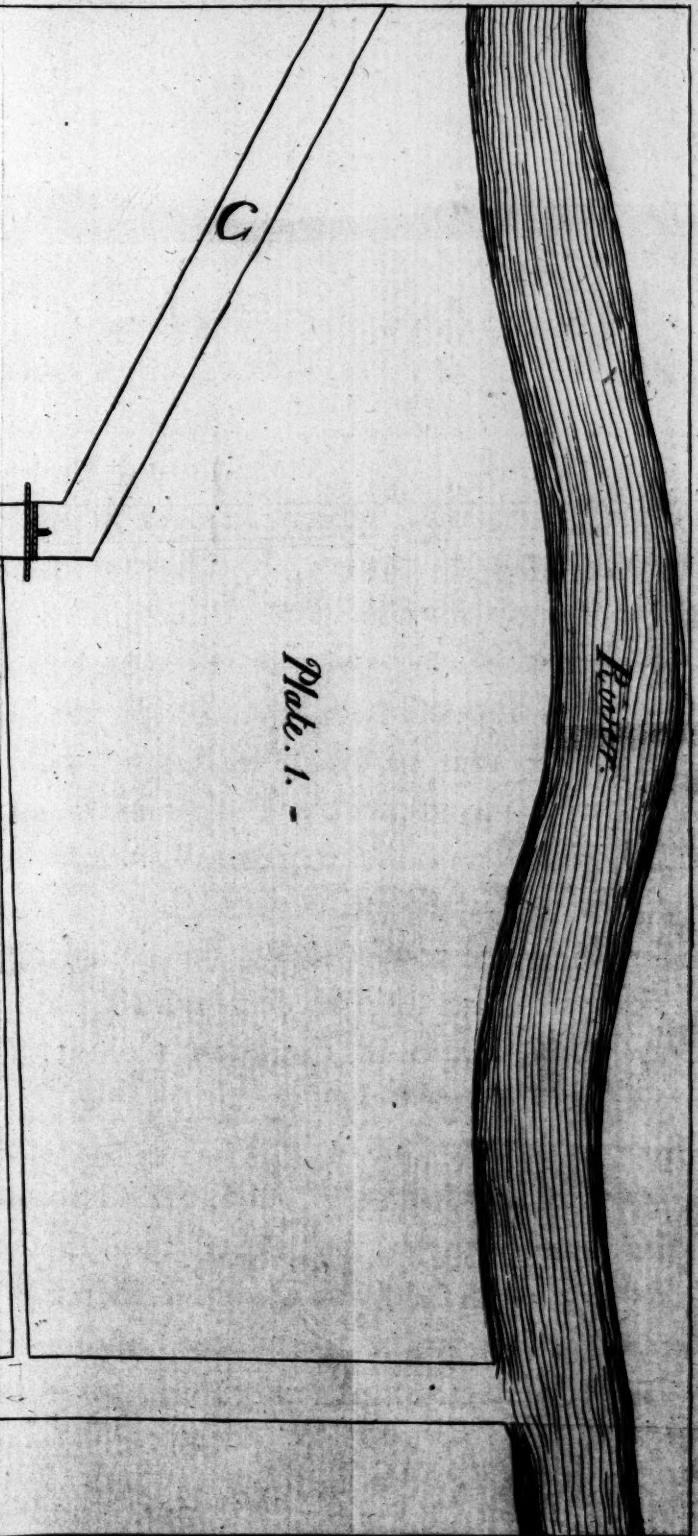
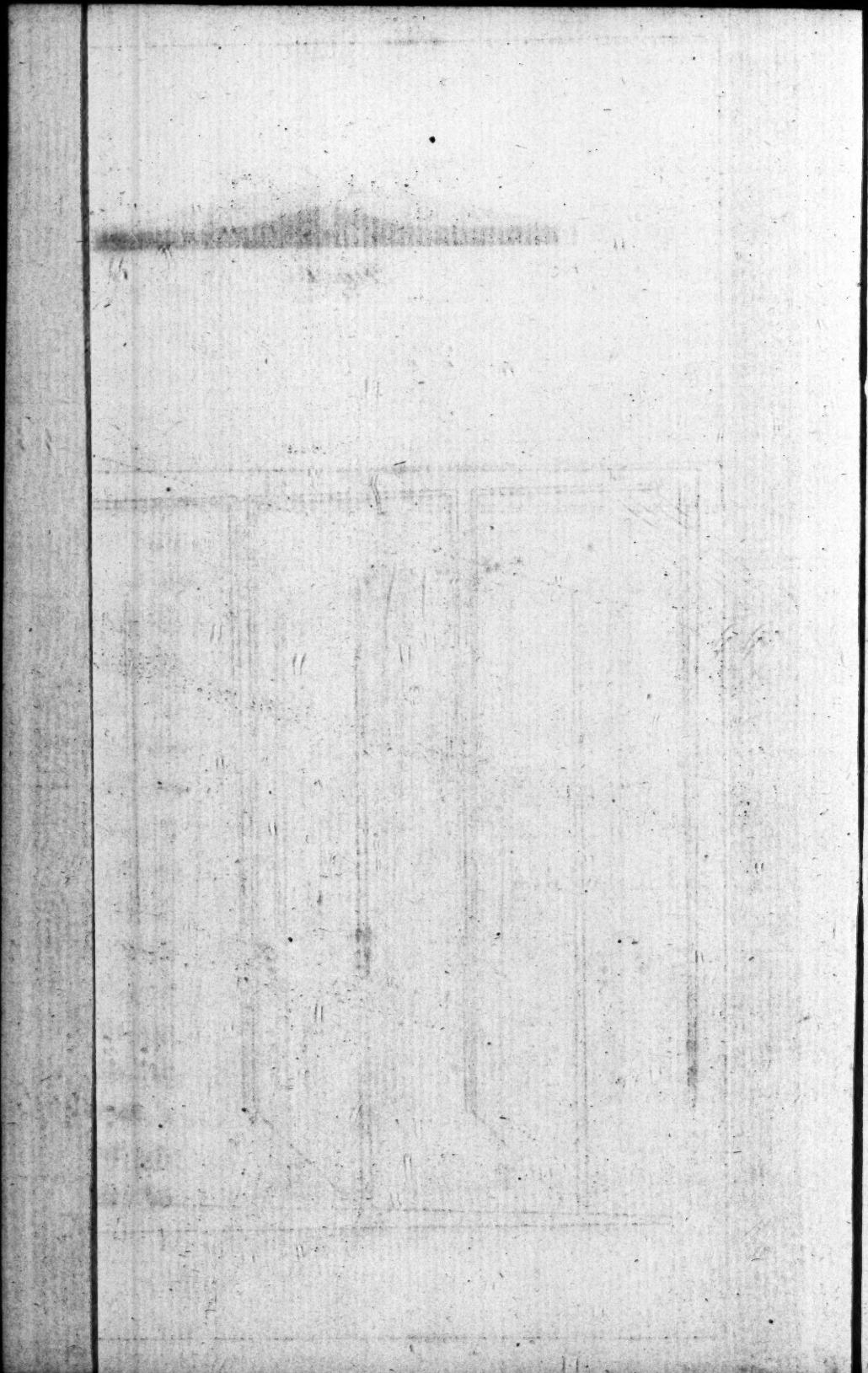


Plate. I. -





is abundantly sufficient for the floating of the meadow. This mode of gaining or reserving descent is well worthy of public attention, and if generally adopted, would bring thousands of acres within the fertilizing power of this practice, which, are now thought to be utterly beyond the reach of the water. I have seen water thus conducted, for more than the distance of a mile, which has afterwards amply compensated for the expence of the work. The feeder is here cut along the higher part of the meadow; and from it, at right angles, the floating gutters are made to branch down the descent of the meadow. The floating gutters, I have marked with a double line, in order to shew more plainly the summit of the ridges, along which they proceed; and all the ditches described by single lines, are drains which receive the water, after it has passed over the sides of the ridges or the beds, and convey it into the master-drain, which empties itself into the bed of the stream, at the lowest corner of the meadow. One drain, as is

shewn in that which is nearest to the flood-hatch, should, in every meadow, have so near a communication with the feeder, that, when the water is to be taken off, the hatch may be let down, and the mouth of this drain opened, and then every bed will almost instantaneously be laid dry, and no water long remain in the ditches, to soak into the land. I have represented the stops, which are required in the feeders and floating gutters, by small circles and the letter S. The strong lines drawn from the lower end of two of the floating gutters, and marked T. T. are meant to signify two shallow ditches called trenches, whose office, it is to carry the water to the corners of the beds, which otherwise would not reach them.

To float such a piece of land as this, where the declivity is gentle, and all one way, can be no very difficult task one would think, even to a person who has never seen the practice.

By

By Fig. 1. in this Plate, I mean to represent a transverse section of a ridge, made on a flat surface, in its first year of formation, when it is only raised a little in the centre, with the soil that is dug out in making the floating gutter and drains, and has just descent enough to throw the water into the drains.

Fig. 2, in this Plate, is meant to denote a ridge, in its full and complete elevation, with its sides or beds a perfect inclined plane, with the desirable fall of about two inches in each yard.

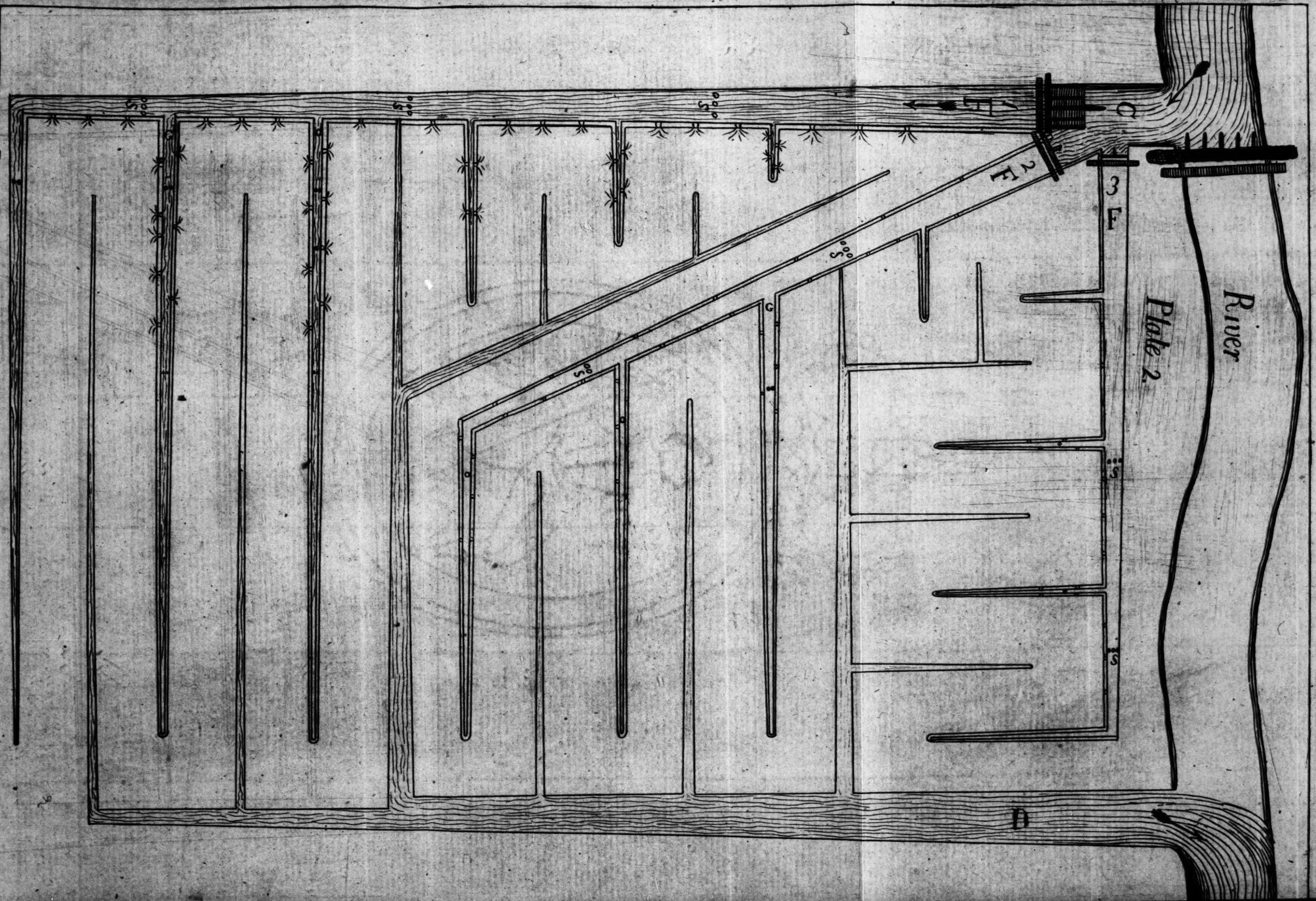
PLATE II.

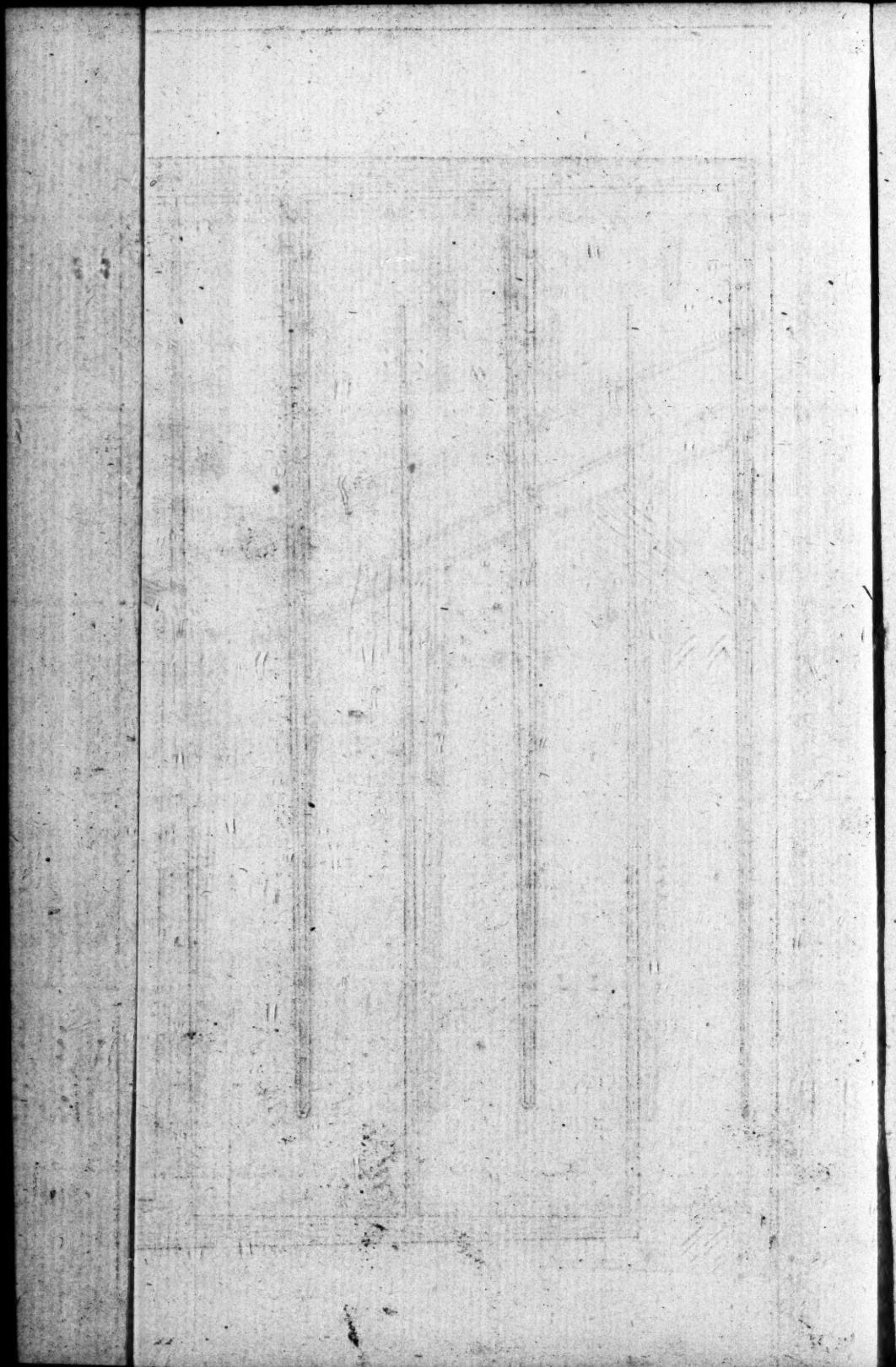
IN Plate 2, I have attempted to delineate a floated meadow, formed from a piece of land which had an irregular surface, or which had three parts considerably higher than the general surface of the land. In order to throw the water over these higher parts, it was necessary that each should be accomodated with a seperate feeder, as is shewn in F. 1, F. 2, F. 3, and that each of these feeders, should be so constructed, as to suffer the water incessantly to pass over the whole length of its sides, and into the floating gutters; and, at the same time, to convey water enough to cover these distant parts. In this instance, the stream, by means of a dam erected opposite to the higher corner of the meadow, is found to be high enough to overflow every part of the surface, without the necessity, as in Plate 1, of fetching the water from a higher part of the stream. In this Plate, I have endeavoured to exhibit one feeder

in

River

Plate 2





in the act of distributing the water. By means of the wear or dam, which, it will here be seen, is made so complete, as not to suffer any water to flow down its usual channel, the whole stream is diverted and made to pass through the conductor, and through the uplifted hatch into the feeder F. 1, where meeting with the obstruction of the stops, it is forced into the floating-gutters, and over the left side of the feeder, or through notches, or small appertures, which I have represented as spreading the water, not only from the feeder, but likewise from the floating gutters. It will here likewise be seen, in what manner the drains unite in conveying the water into the master-drain, which reconducts it into its wonted course. The bed of the river below the wear, it will here be observed, is entirely free from water or empty; therefore, the returning water has that depth of the bed of the river, added to the descent which is found in the distance between the wear, and the mouth of the master-drain. The hatches in the mouths of F. 2, F. 3,

are

are shut, and no water of course is upon that part of the meadow, which they are made to float; when, however, that part which is supplied by F. 1, has had the water a sufficient time, its hatch will be let down, and these two opened; for the stream will afford water enough for F. 2, and F. 3, at one turn, as they both do not supply a greater extent of floating-gutters than F. 1, supplied. Thus, in this meadow, the process of floating may conveniently be alternate through the whole winter.

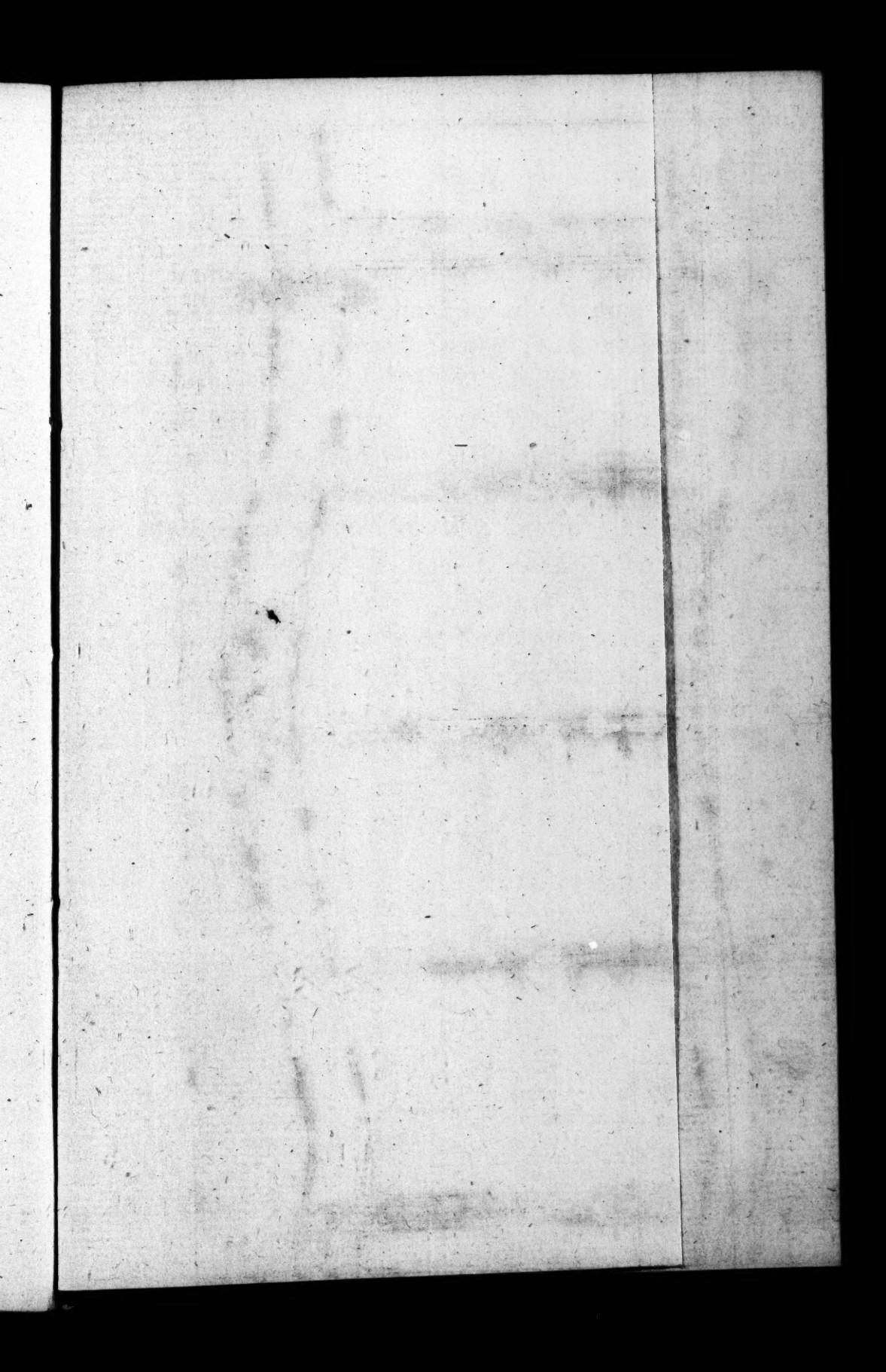


Plate 3.

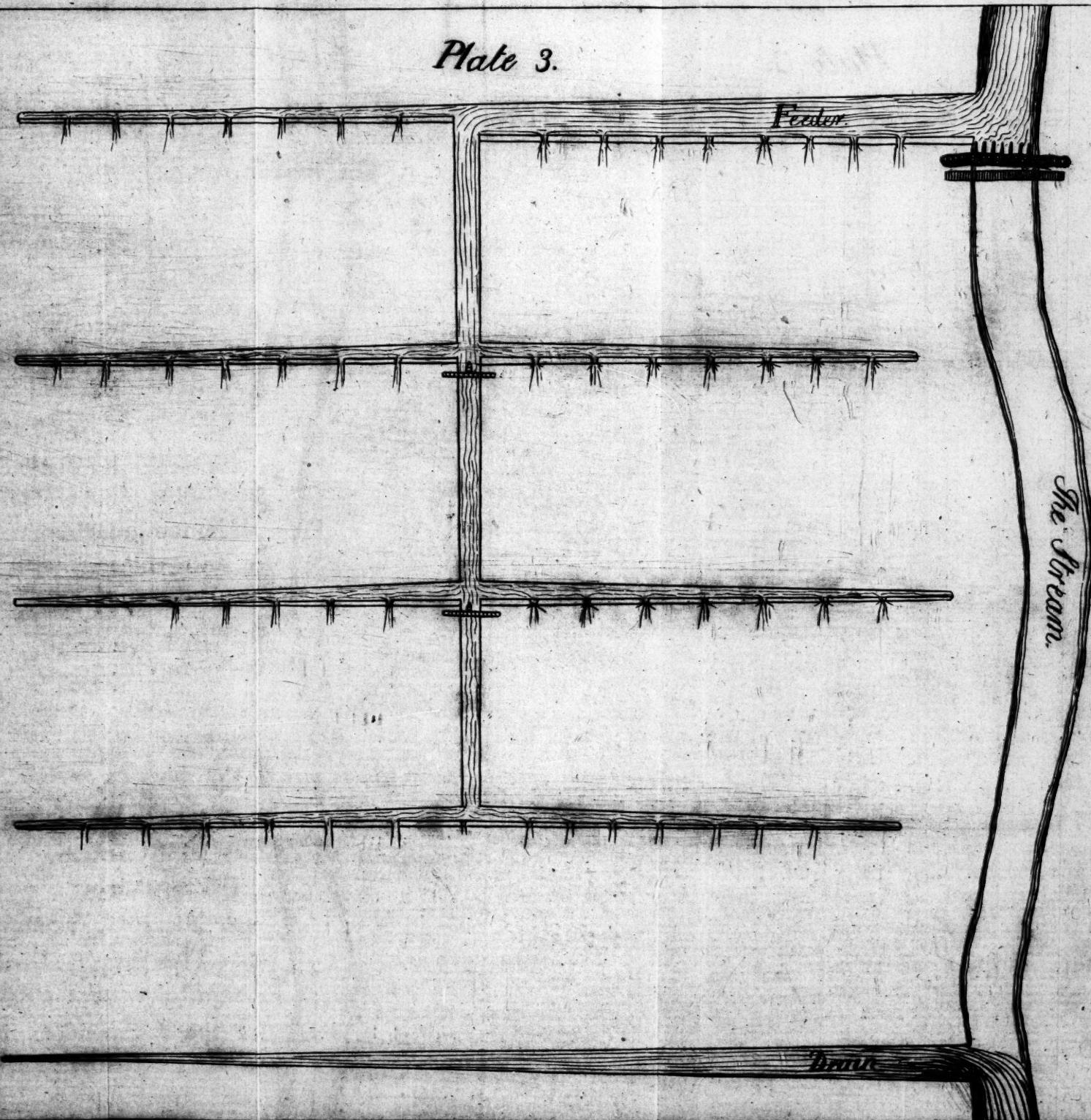


PLATE III.

IN Plate 3, I have given a sketch of a species of floating, commonly called catch-work, a species, very different from that which I have described and recommended above, and which ought never to be adopted when the other plan is practicable. In some situations, however, the declivity of the land is too great to admit of its being thrown into ridges, with their respective floating-gutters pointing down the descent; and, therefore, it becomes necessary to make the distributing ditches at a certain distance below each other, *across* the declivity, to catch the water, again and again, from the top to the bottom of the meadow. It is evident, that the contents of the water thus repeatedly used, are not equitably disposed of, for the upper beds must receive more than their share of whatever nutriment it deposits. The best method which I have seen of adjusting this inequality of distribution, is the following: to continue the

feeder down the centre of the declivity to the last bed, and then by means of small hatches placed below the ditches, as in the plate, which are so contrived, as to suffer a certain quantity of water to pass through them, some of the first and best water, is conveyed unused even to the lowest bed. These hatches likewise give a power of floating the beds alternately, or of throwing the water over the first and third, and laying the second and fourth beds dry, or vice versa.

I am sorry to say, that I have seen the common plan of catch-work watering reported to, when there was no absolute necessity for its adoption, when there has been no rapid descent in the land to demand it; I have seen it used, merely because it was less difficult in the execution, than the other system, and because it did not require so great a number of stops, which, Mr. Boswell says, page 124, "Would offend the eye greatly." I confess that I am not one of those who view stops, in a meadow,

in the light of a deformity, but rather one of those who think that nothing can tend to disfigure a meadow that is instrumental in producing a good crop of grass. When I see a great number of stops, I know, that the water flows with its proper rapidity and quantity, and will have its profitable effect.

This plan will immediately be understood upon viewing the plate, and is easily executed. I have introduced notches here, as well as in the other plates, not as absolutely necessary in either plan, but as giving a facility in the execution of each. The place of the notches is not certain or fixed, but variable at pleasure.

Directions to be observed in each Month of Floating.

At the beginning of the month of November, each work or ditch, in one of these meadows, should be well cleansed of all weeds and long grass which are found in it, and should have its sides or banks well repaired, where they have received injury from the treading of the cattle. The after-math is, of course, before this time, eaten off bare. I was in Gloucestershire in the last week of the month of October, and saw most of the floated meadows, in the parish of South Cerney, in a state of preparation for the water; and some of them I found had already taken advantage of the heavy rains that were then falling; and were completely floated. The reason which the farmers gave me, for their thus taking the water earlier than usual, was, that they are now under the hard necessity of catching the water when they can, whenever abundant rains shall give them an opportunity;

portunity; for the Thames and Severn-Canal, which, unfortunately crosses them above the meadows, in every dry season, takes, and diverts the whole of the stream to supply its own locks. Thus the regularity of their system of floating, is not only interrupted, but sometimes prevented for a whole winter, and the loss is incálculable: and will not any one be astonished, who shall be told, that for this deprivation, the occupiers of the meadows have no compensation made them; although the mills, which are similarly situated, and which, comparatively, are of paltry consideration, receive some of them ninepence, some a shilling, for every hour in which the water is taken from them by the canal. In the month of November, the water may be suffered to continue flowing over the meadow for about three weeks without intermission, and then the land ought to have air given it for a few days; for there are few species of grass, especially those which form the most nutritious part of the herbage of meadow land, that will

long

long exist under an entire immersion in water. In those meadows, however, which have had all due attention of this kind paid to them, and which enjoy a quick descent, I have generally discovered most of the grasses, which are found in the adjoining upland, even the white-clover not excepted. The great object of this early preparation of the meadows, is to take the advantage of the autumnal floods, which bring along with them a great variety of putrescent matter, which is found peculiarly enriching to the land.

In the months of December and January, the chief care of the floater, consists in keeping the land sheltered by the water from the severity of frosty nights. It is necessary, however, through the whole of these months, every ten days or fortnight, to give the land air, and to lay it as dry as possible, for the space of a few days. Whenever the frost has given a complete sheet of ice to a meadow, it is advisable to discontinue floating, for the frost will some-

sometimes take such strong hold upon the land, as to draw it into heaps, and very much injure the evenness of the surface of the beds. It is requisite in these two months, that each meadow should be inspected, at least, once in every week, to see that the equal distribution of the water, is not obstructed by the continual influx of weeds, leaves, sticks, and the like.

In the month of February, a more than common degree of attention is required by the floated meadow. If you now suffer the water to flow over the meadow for the space of many days without intermission, a white scum is generated, which is found very destructive to the grass; and if you now take off the water and expose the land, in its wet state, to a severe frosty night, a great part of the tender grass will be cut off. In Gloucestershire, two methods of avoiding these injuries are practised: one is, to take the water off by day, to prevent the scum, and to turn it over again at night, to guard against the frost; the other method is,

is, to take the water off early in the morning, and if that day be dry to suffer it to remain off for a few days and nights; for if the land experiences only one drying day, the frost at night will do little injury. The former of these practices, where it is found not too troublesome, is preferable to the latter; and the simply constructed wears of the above county, are well calculated for the adoption of this rule, since any part of them is removable at pleasure, whatever may be the severity of the frost. About the middle of this month, the floater begins to use the water rather more sparingly, than in autumn or winter, for his chief object now is to encourage or force vegetation.

At the beginning of the month of March, the crop of grass on the old floated-meadows, will generally be sufficient to afford an abundant pasture to any kind of farming stock, and the water is taken off for nearly a week, that the land may become dry and firm, before the heavy cattle are admitted.

admitted. It is proper, in the first week of eating off the spring-feed, if the season be cold or rainy, to give the cattle a little hay in the evening, to intermix with their moist food. Some farmers, very discretely, give the spring-grass of their meadows to their ewes and lambs, in the same manner as their crop of turnips, by allotting them a certain portion each day, by means of hurdles or flakes, and giving them hay at the same time. This is certainly making the most of the grass, and an excellent method of fining and sweetening the future herbage.

In the month of April, the grass of these meadows, may be eaten off as short and close as you please, but never later; for if you trespass only one week upon the month of May, the hay crop will be very much impaired, the grass will become soft and woolly, and have more the appearance and quality of latter-math hay, than hay of the first crop.

At the beginning of the month of May, the water is again thrown over the meadows for a few days, which, as a mere wetting of the land, will, in most seasons, insure the hay crop; will insure in the course of six or seven weeks, a ton and a half of hay upon an acre, which is as much as will be desired by any person who pays a due regard to the quality of his hay. The water is sometimes again used, when the hay is carried off; this however will depend upon circumstances, and is to be done at the discretion of the proprietor, who will take care that sheep do not eat the latter-math. Water, which is rendered turbid by sudden and impetuous rain, in the summer months, I know from experiment, is peculiarly enriching to a floated meadow.

We hear of instances, in other countries, of two or more crops of hay being reaped from the same watered-meadow, in the space of one year; but, in this island, the
man

(91)

man who consults the good of his land,
or eventually his own true interest, will be
contented with one hay-crop in each year.

N 2

Answers

Answers to Objections.

IT may not be improper, before I conclude to make some reply to a few objections which are too often made to the practice of floating. The most weighty of these objections, is the expence necessarily incurred in executing the work, and the waste of land in cutting so many wide ditches. To both these objections, one satisfactory answer, I presume, may be given: that although even a fourth part of a meadow be consumed in ditches, yet if the remaining three parts shall produce at least twice the crop which the whole land before produced; there is no room for complaint either of loss of land, or that five or six pounds per acre, have been expended upon the meadow.

Another objection arises from an apprehension, that this use of the water will give encouragement to the growth of rushes. In answer to this objection I can say, that

that the effect is found otherwise ; for this practice is never known to propagate rushes ; and in land where they before prevailed, by the very frequent occurrence of its deep drains, it tends powerfully to check and to destroy them.

Another objection to this practice arises from a supposed inferiority in the quality of floated-meadow hay. This inferiority however, is not the fault of the land, but of the occupier of the meadow : for many farmers too attentive to quantity, suffer their grass to remain uncut till it will produce nearly three tons to an acre, and then, it naturally will become long, coarse, and little better than straw. But those farmers, who are wise enough to cut their grass in the month of June, and who have been fortunate enough to have used muddy water in the winter, will find their hay very little inferior in quality to the best upland hay.

There

There remains another objection or rather obstruction to this art still unmentioned; which, in many situations, operates as a prohibition; I mean the entire power over the water of many streams which is possessed by the proprietors of mills. This exclusive claim, to the great detriment of the community, prevents the improvement of numberless acres; but this objection, one would hope, will, ere long, be removed by the adjusting interference of parliament.

I have thus thrown together the sum and substance of all that I have seen, heard, and read on the subject of watering or floating meadow land: and, if what I have here written, shall in any degree tend to give a clearer conception of the true practice than has hitherto been conveyed, or shall induce even any one person to try the extent of the advantage to be derived by floating from a large and rapid river, I shall, at least, feel, that I cannot be deemed an intruder, on the present occasion.

I shall

I shall still think it my duty, to give any further explanation or information in my power; and if any one, imagining that he has a considerable tract of land capable of being thus improved, and yet suspecting that difficulties may occur, which he himself may not be able to surmount, be desirous that I should send him a Gloucestershire floater; I shall be happy in executing such a commission; because I imagine that I can thereby serve both the proprietor of the land and the floater; and at the same time benefit the public. A letter addressed to me (free of postage) at Mr. Scatcherd's, Bookseller, Ave-maria-lane, London, will readily find me. The above floaters usually charge a guinea per week and their board, and will not only take an active part in the manual labour, but will give instructions to as many men, as it may be thought fit to employ under their direction.



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